WHAT IS CLAIMED IS:

1. An integrated optical parametric oscillator:

an input face being anti-reflective to an incident pump beam;

an optical-parametric-oscillation region along an optical path of the pump beam, the optical-parametric-oscillation region being operative to convert the pump beam into a signal beam and an idler beam, wherein the input face is reflective to the signal beam and the idler beam;

a grating along an optical path of the signal beam and the idler beam converted by the optical-parametric-oscillation region, the grating being operative to diffract at least a portion of the signal beam;

a reflecting plane positioned along an optical path of the signal beam diffracted by the grating, wherein the reflecting plane is reflective to the signal beam;

an ultra-fine-steering region between the reflecting plane and the grating, the ultra-fine-steering region being operative to steer the optical path of the signal beam diffracted from the grating; and

an output face along an optical path of the signal beam reflected from the grating, the output face being reflective to the pump beam and the idler beam and partially transmissive to the signal beam.

2. The integrated optical parameteric oscillator of Claim 1, wherein the ultra-fine-steering region is operative to select a narrow line of the signal beam by steering the optical path of the signal beam diffracted from the grating.

3. The integrated optical parametric oscillator of Claim 1, wherein the input face, the optical-parametric-oscillation region, the grating, the output face, the reflecting plane and the fine-steering region are integrated on a single slab of a nonlinear optical bulk material.

4. The integrated optical parametric oscillator of Claim 3, wherein the nonlinear optical bulk material includes a lithium niobate material.

5. The integrated optical parametric oscillator of Claim 3, wherein the optical parametric-oscillation region includes a part of the nonlinear optical bulk material being periodically poled.

6. The integrated optical parametric oscillator of Claim 3, wherein the ultra-fine-steering region includes a part of the nonlinear optical bulk material and a pattern of electrodes deposited on two opposing surfaces of thereof.

7. The integrated optical parametric oscillator of Claim 3, wherein the ultra-fine-steering region includes a part of the nonlinear optical bulk material subjected to an electric field.

8. The integrated optical parametric oscillator of Claim 1, wherein the pump beam has a wavelength of about 1.064 micrometers, the signal beam has a wavelength of about 1.54 micrometers, and the idler beam has a wavelength of about 3.442 micrometers.

9. The integrated optical parametric oscillator of Claim 1, wherein the pump beam has a wavelength of about 1.064 micrometers, the idler beam has a wavelength of about 1.54 micrometers, and the signal beam has a wavelength of about 3.442 micrometers.

10. The integrated optical parametric oscillator of Claim 1, wherein the grating includes a holographic grating with about 200 grooves/mm to about 500 grooves/mm.

11. An integrated optical parametric oscillator, comprising a nonlinear optical bulk material in which a locally periodically-poled region and a fine-steering region subjected to an electric field are formed.

12. The integrated optical parametric oscillator of Claim 11, further comprising a grating between the locally periodically poled region and the steering region to diffract an optical signal into various wavelength components towards the fine-steering region.

13. The integrated optical parametric oscillator of Claim 12, wherein the fine steering region is operative to steer a selected one of the wavelength components with a predetermined angle.

14. The integrated optical parametric oscillator of Claim 11, further comprising a reflecting plane to reflect the steered wavelength component back to the grating.

15. The integrated optical parametric oscillator of Claim 11, wherein the nonlinear optical bulk material includes lithium niobate.

16. The integrated optical parametric oscillator of Claim 11, wherein the locally periodically-poled region has a length of about 30 mm.

17. The integrated optical parametric oscillator of Claim 11, wherein the nonlinear optical bulk material further comprises a plurality of exterior coated planes forming a resonator of a wave at a predetermined wavelength.

18. A tunable, narrow-line laser system, comprising:

a pump beam source, operative to generate a pump beam;

an integrated optical parametric oscillator, including a nonlinear optical bulk crystal, which further comprises:

an input face of the pump beam;

an optical-parametric-oscillation region converting the pump beam into a signal beam and an idler beam;

a grating reflecting a portion of the signal and the idler beam and diffracting the other portion of the signal beam and the idler beam;

an output face, coupling out the portion of the signal beam reflected from the grating and reflecting the portion of the idler beam reflected from the grating;

a reflecting plane, reflecting the other portion of the signal and idler beams diffracted from the grating; and

a fine-steering region between the grating and the reflecting plane for generating an optical path difference of the other portion of the signal and idler beams reflected from the reflecting plane and incident on the grating.

19. The tunable, narrow-line laser system of Claim 18, wherein the pump beam source includes a Nd:YAG laser.

20. The tunable, narrow-line laser system of Claim 18, wherein the nonlinear optical bulk crystal includes a lithium niobate crystal.

21. The tunable, narrow-line laser system of Claim 18, wherein the optical-parametric-oscillation region includes a periodically-poled region of the nonlinear optical bulk crystal.

22. The tunable, narrow-line laser system of Claim 18, wherein the optical-oscillation-region has a length of about 30 mm.

23. The tunable, narrow-line laser system of Claim 18, wherein the optical-parametric-oscillation region being operative to convert the pump beam into the signal beam with a wavelength of about 1.54 μm and the idler beam with a wavelength of about 3.442 μm.

24. The tunable, narrow-line laser system of Claim 18, wherein the optical-parametric-oscillation region being operative to convert the pump beam into the signal beam with a wavelength of about 3.442 μm and the idler beam with a wavelength of about 1.54 μm.

25. The tunable, narrow-line laser system of Claim 18, wherein the fine-steering region includes a region of the nonlinear optical bulk crystal subjected to an electric field.

26. The tunable, narrow-line laser system of Claim 18, wherein the input face, the grating, output face, and the reflecting plane are all reflective to the idler beam and arranged as a resonator of the idler beam.

27. The tunable, narrow-line laser system of Claim 18 being operative to generate a narrow-line output with a first power to seed a laser or an optical parametric oscillator with a second power, wherein the second power is higher than the first power.

28. The tunable, narrow-line laser system of Claim 27 being operative to generate the narrow-line output at about 1.5 microns.

29. The tunable, narrow-line laser system of Claim 27 being operative to generate the narrow-line output between 1 microns and 5 microns.

30. The tunable, narrow-line laser system of Claim 27 being operative to generate the narrow-line output between 8 microns and 12 microns.